

WHAT IS CLAIMED IS:

1. A multipole overvoltage protection system for a multiphase power supply system, including at least two overvoltage protection elements (1); each leg (2, 3, 4, 5) of the power supply system having one overvoltage protection element (1) arranged therein, wherein the individual overvoltage protection elements (1) are coupled to each other in such a manner that when one overvoltage protection element (1) is ignited, all other overvoltage protection elements (1) are ignited as well.
2. The overvoltage protection system as recited in Claim 1, wherein the individual overvoltage protection elements (1) each have one ignition aid (6) and the individual ignition aids (6) are coupled to each other.
3. The overvoltage protection system as recited in Claim 1, wherein a central ignition aid (6) is provided to which all overvoltage protection elements (1) are connected.
4. The overvoltage protection system as recited in one of the Claims 1 through 3, wherein all overvoltage protection elements (1) are located in a common housing (8).
5. The overvoltage protection system as recited in Claim 4, wherein the individual overvoltage protection elements (1) have a first electrode (9), a second electrode (10), and an air breakdown spark gap (11) present or acting between the two electrodes (9, 10); the electrodes (9, 10) of the individual overvoltage protection elements (1) being arranged with respect to each other such that when the air breakdown spark gap (11) of one overvoltage protection element (1) is ignited, the air breakdown spark gaps (11) of the other overvoltage protection elements (1) are ignited as well because of the plasma present.
6. The overvoltage protection system as recited in Claims 2 and 5, wherein each ignition aid (6) is formed by an ignition electrode (12) and an ignition circuit (13) which is connected to the ignition electrode (12).
7. The overvoltage protection system as recited in Claims 3 and 5,

wherein the central ignition circuit (6) is formed by a plurality of ignition electrodes (12) and a central ignition circuit (13) which is connected to the ignition electrodes (12); each ignition electrode (12) cooperating with one overvoltage protection element (1), respectively.

8. The overvoltage protection system as recited in one of the Claims 5 through 7, wherein the individual electrodes (9, 10) and, if applicable, the ignition electrode (12) are arranged coaxially with respect to each other.

9. The overvoltage protection system as recited in Claim 8, wherein the individual electrodes (9, 10) and, if applicable, the ignition electrode (12) have different cross-sections over their length.

10. The overvoltage protection system as recited in one of the Claims 4 through 9, wherein the interior space of the housing (8) surrounding the electrodes (9, 10, 12) is provided with a lining (13) which is composed, in particular, of POM-Teflon.

11. The overvoltage protection system as recited in one of the Claims 4 through 10, wherein the housing (8) surrounding the electrodes (9, 10, 12) has a sealed, pressure-tight and pressure-resistant design, and, in particular, has an outer pressure cylinder.

12. A method for the reliable operation of a multipole overvoltage protection system, in particular according to one of the Claims 1 through 11, in a multiphase power supply system, in particular, in a low voltage system; the overvoltage protection system having at least two overvoltage protection elements which are each arranged in a leg of the power supply system, wherein when a single overvoltage protection element is ignited, all other overvoltage protection elements are ignited as well.

13. The method as recited in Claim 12, the individual overvoltage protection elements each having one ignition aid, wherein igniting of an ignition aid of one overvoltage protection element will cause all other ignition aids to be ignited as well.

14. The method as recited in Claim 12, the individual overvoltage protection elements being designed as air breakdown spark gaps and located in a common housing, wherein the plasma produced upon igniting of an air breakdown spark gap of one overvoltage protection element will ignite the breakdown spark gaps of the remaining overvoltage protection elements as well.